



Aldehydes

AND

Ketones

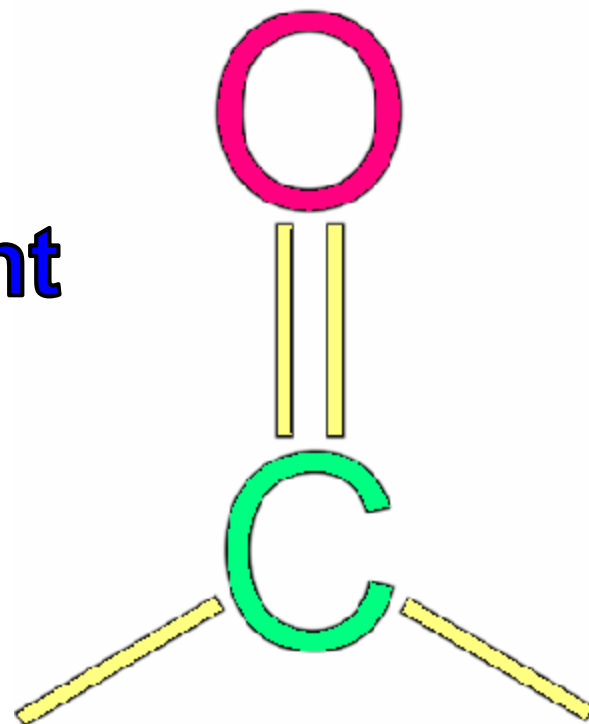
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Carbonyl Group

Functional group with **C=O** double bond

This is a **polar group**:

- **increase boiling point**
- **increase solubility**

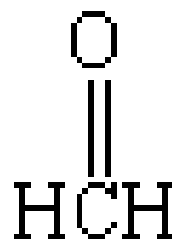
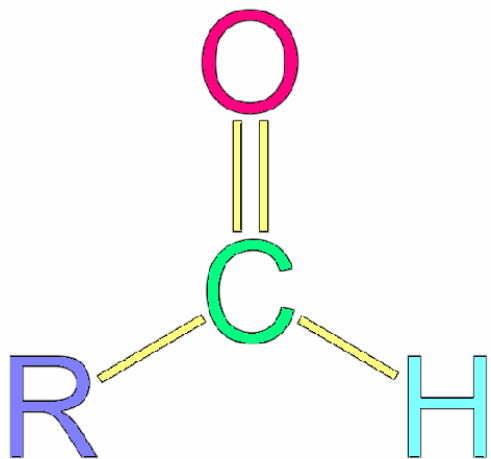


1) Aldehydes

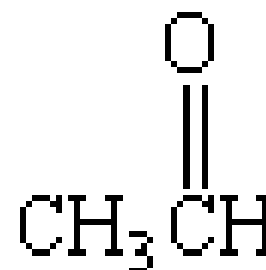
Carbonyl group occurs at either end of the chain:

1) Carbon of the carbonyl group is **CARBON 1** in the chain

2) The suffix “**-al**” is replaces the “**-e**”

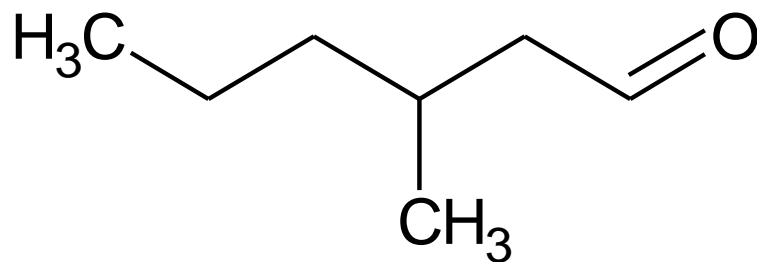
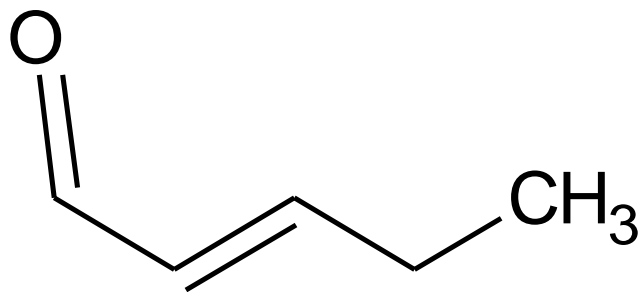


Methanal



Ethanal

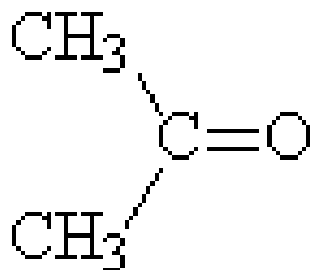
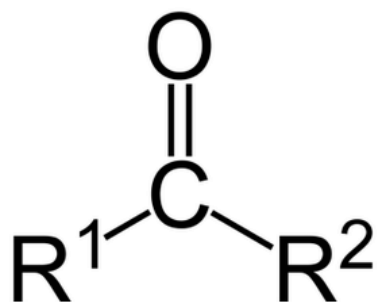
Try These...



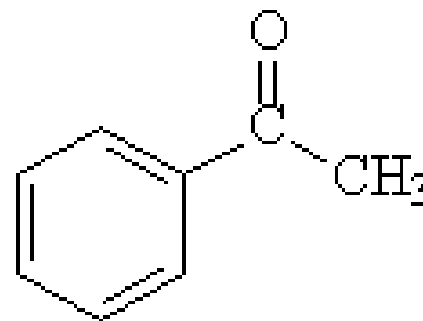
2) Ketones

The carbonyl group occurs somewhere in the middle of the hydrocarbon chain:

- The suffix “-one” is added the end of the name

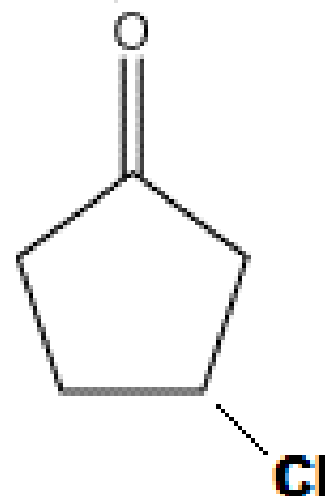
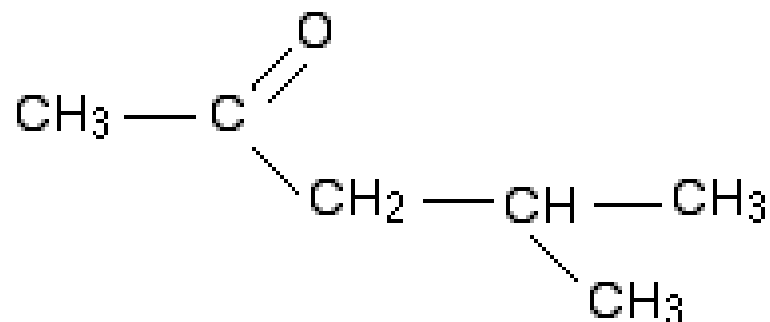


2-propanone



2-phenyl-2-ethanone

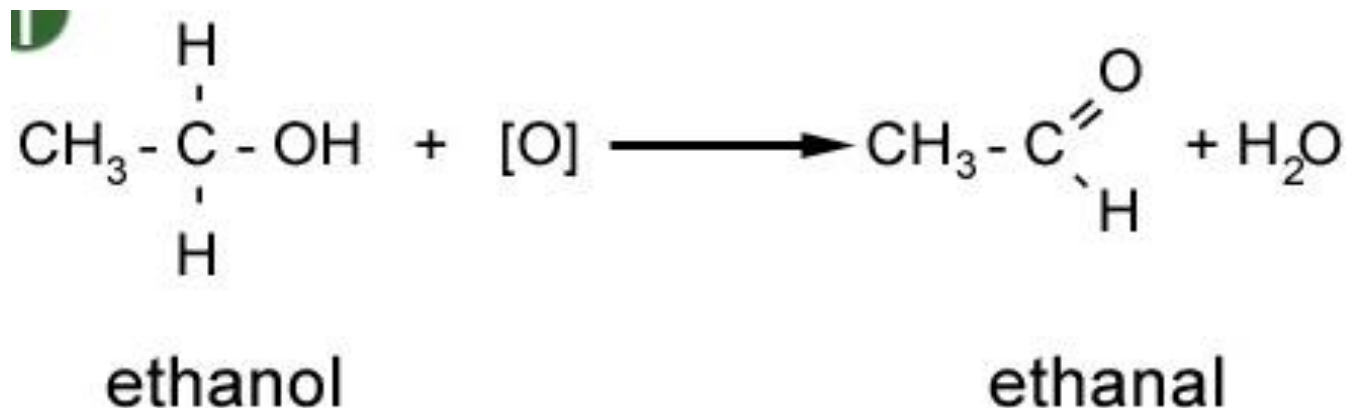
Try These...



3) Reactions: Oxidation

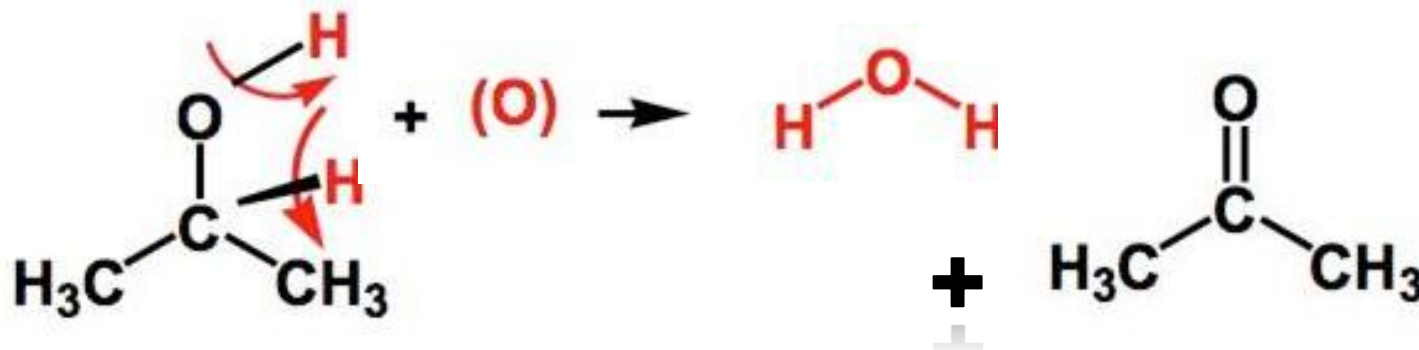
- “**oxidation**” is either a **gain of oxygen** or a **loss of hydrogen**.
- These reactions require an *oxidizing agent*:
 - hydrogen peroxide: H_2O_2
 - potassium dichromate: $\text{K}_2\text{Cr}_2\text{O}_7$
 - potassium permanganate: KMnO_4
 - Generic Oxidizing Agent: (O)

Aldehydes from 1° Alcohols



- **Oxidizing Agent removes two H atoms:**
one from the OH group, and one from the C bonded to the O atom
- A **carbonyl group** forms (C=O) and **water**

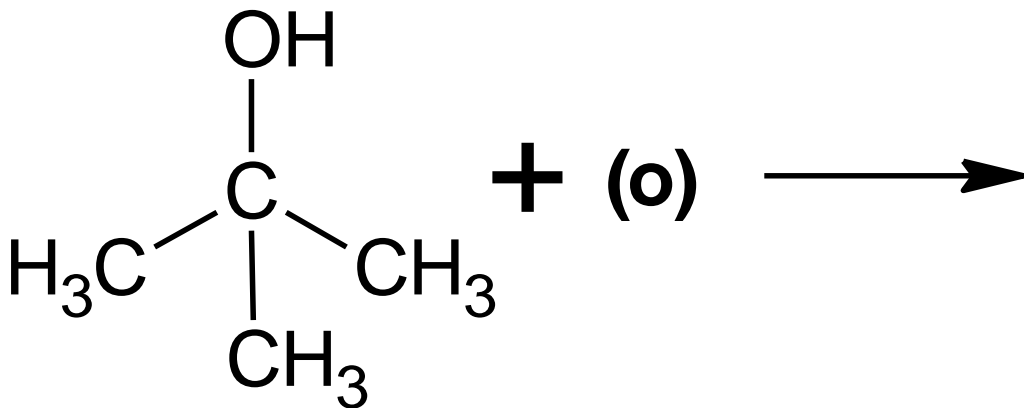
Ketones from 2° Alcohols



When a **secondary alcohol** is oxidized, the carbonyl group is attached **to two alkyl** groups, forming a **ketone** and water.

3° Alcohols?

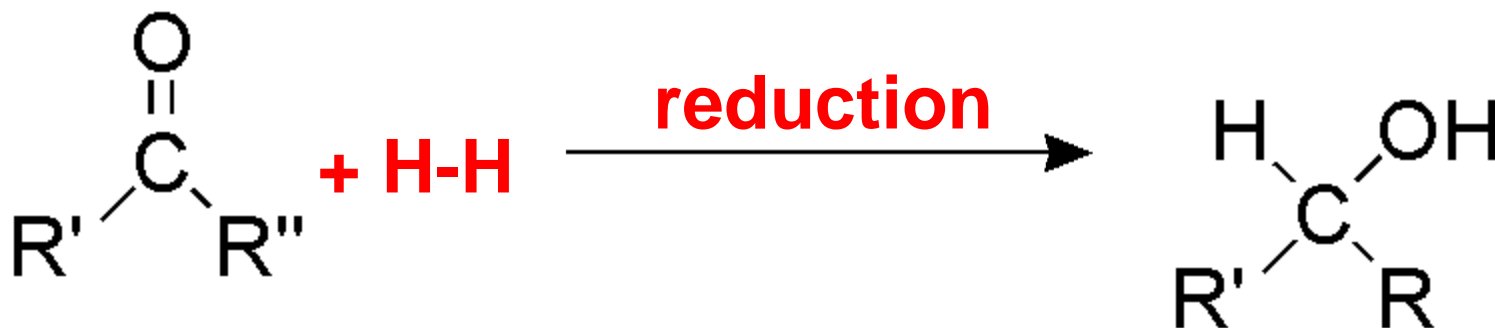
- Tertiary alcohols do not undergo **oxidation** because no H atom is available on the central C atom.



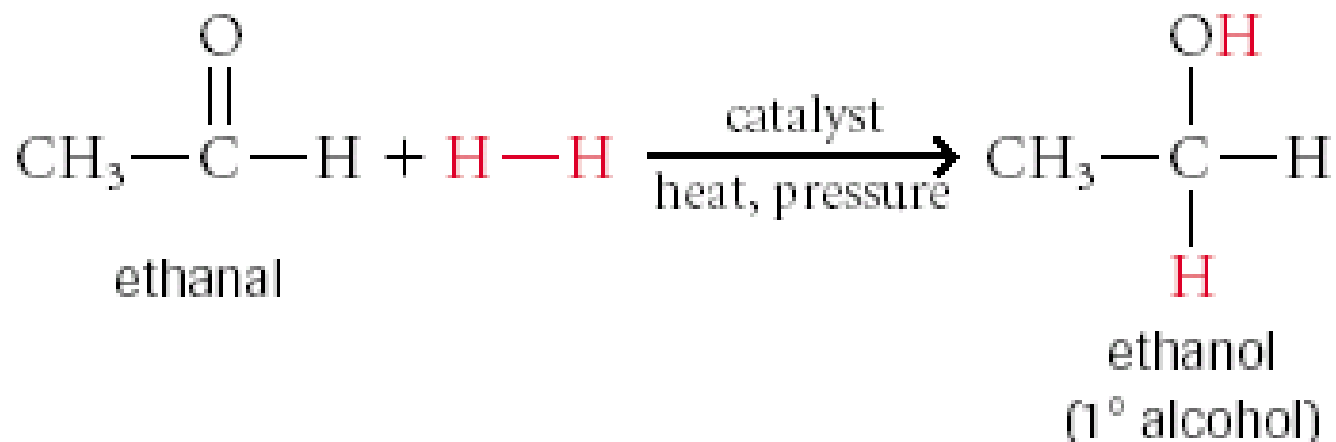
4) Reactions - Reduction

Reduction reactions involve the **loss of oxygen** or the **addition of hydrogen**
(also called “**hydrogenation**”)

The **C=O double bond** in carbonyl groups is broken and the new available bonds contain H



aldehydes always produce **primary alcohols**



ketones always produce **secondary alcohols**

